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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/630,747 | 07/31/2003 | Takeshi Matsunuma | 402729 | 9933 |

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LEYDIG VOIT & MAYER, LTD
700 THIRTEENTH ST. NW
SUITE 300
WASHINGTON, DC 20005-3960

| EXAMINER | |
|---|---|
| GUERRERO, MARIA F | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2822 | |

DATE MAILED: 12/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/630,747 | MATSUNUMA, TAKESHI | |
| | Examiner | Art Unit | |
| | Maria Guerrero | 2822 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *05 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *2-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. This Office Action is in response to the amendment filed October 5, 2004.

### Status of Claims

2. Claim 1 is canceled. Claims 2-6 are pending

### *Priority*

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (U.S. 6,277,760).

5. Lee et al. teaches forming a film to be processed on a substrate, forming a ruthenium film as a mask material on the film to be processed, and forming a resist pattern on the mask material (Fig. 3A-3B, 4A-4C, col. 3, lines 9-23, col. 4, lines 1-15, col. 5, lines 4-35). Lee et al. discloses patterning the mask material using the resist pattern as a mask, patterning the film to be processed using the mask material, after patterning, as a mask (Abstract, col. 5, lines 4-35). Lee et al. shows removing the mask material (Abstract, Fig. 3D, 4E).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKee (U.S. 5,804,088) in view of Nam (U.S. 6,291,251).

7. McKee teaches forming a film to be processed on a substrate, forming a mask material on the film to be processed, and forming a resist pattern on the mask material (Fig. 8a-8b, col. 2, lines 30-40, col. 5, lines 30-65). McKee discloses patterning the mask material using the resist pattern as a mask, shrinking the mask material after patterning (Fig. 8c-8d, col. 5, lines 59-65, col. 6, lines 1-6). McKee describes patterning the film to be processed using the mask material, after shrinking, as a mask (Fig. 8e, col. 6, lines 1-15). McKee shows removing the mask material (col. 6, lines 13-15). Mckee teaches removing the mask material together with the resist pattern in a different embodiment and employing oxygen-containing plasma to remove the resist pattern and may also remove the mask material (Fig. 9c, col. 6, lines 7-15). Mckee discloses after removing the mask material a metal material is exposed on the substrate because McKee suggested that the film to be processed is a polysilicon or a metal (Abstract, col. 6, lines 12-15).

8. McKee does not specifically show the mask material being a ruthenium film. However, Nam shows the mask material being a ruthenium film (col. 4, lines 1-30, col. 7, lines 22-34).

9. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify McKee's process by employing ruthenium instead of titanium nitride as the mask material in order to increase the etch selectivity.

***Response to Arguments***

10. Applicant's arguments filed October 5, 2004 have been fully considered but they are not persuasive. Claims 2-6 stand rejected.

Applicant argued that Lee makes clear that Lee rejects the possibility of employing a photoresist as a mask when etching a ruthenium mask material. However, claim 4 recites patterning the mask material using the resist pattern as a mask. Lee discloses patterning the mask material using the resist pattern as a mask (Fig. 3A-3B, col. 3, lines 15-20; col. 6, lines 10-26).

In response to applicant's argument that one of skill in the art would not replace the BARC mask 821 of Figure 8c of McKee with a ruthenium layer, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Furthermore, disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify McKee's process by employing ruthenium instead of titanium nitride as the mask material in order to increase the etch selectivity.

In addition, the elements must be arranged as required by the claim, but this is not an ipsissimis verbis test, i.e., identity of terminology is not required. In re Bond, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Furthermore, during patent examination, the pending claims must be "given *>their< broadest reasonable interpretation consistent with the specification." > In re Hyatt, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). While the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their

terms reasonably allow. > In re American Academy of Science Tech Center, F.3d, 2004 WL 1067528 (Fed. Cir. May 13, 2004)(The USPTO uses a different standard for construing claims than that used by district courts; during examination the USPTO must give claims their broadest reasonable interpretation.) < This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) >; Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1372, 69 USPQ2d 1857 (Fed. Cir. 2004).

***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 2, 2004

Maria Guerrero

MARIA F. GUERRERO
PRIMARY EXAMINER